

Abstract of the Disclosure

An antiferromagnetically exchange-coupled structure for use in a magnetic device, such as a magnetoresistive sensor, includes an underlayer formed of a chemically-ordered tetragonal-crystalline alloy, a chemically-ordered tetragonal-crystalline Mn-alloy antiferromagnetic layer in contact with the underlayer, and a ferromagnetic layer exchange-coupled with the antiferromagnetic layer. The underlayer is an alloy selected from the group consisting of alloys of AuCu, FePt, FePd, AgTi₃, Pt Zn, PdZn, IrV, CoPt and PdCd, and the antiferromagnetic layer is an alloy of Mn with Pt, Ni, Ir, Pd or Rh. The underlayer enhances the transformation of the Mn alloy from the chemically-disordered phase to the chemically-ordered phase. In one example, an exchange-coupled structure with an underlayer/antiferromagnetic layer of AuCu/PtMn allows the PtMn to be made substantially thinner, thus reducing the electrical resistance of the structure and improving the performance of a current-perpendicular-to-the-plane (CPP) magnetoresistive sensor.